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# **Pre-Transition Fertility in Asia: A Comparative-historical Approach**

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## **Abstract**

This paper questions the proposition that fertility was invariably high among populations before the fertility transition. By examining factors affecting pre-transition fertility based on the evidence from Japan and India in the pre-World War II period, together with that from England and Germany in the traditional period, it suggests that in most historical populations fertility was below the supposed biological maximum, and that there was a pre-transition *rising* phase in fertility in countries at both ends of the Eurasian continent. Then the paper asks if the phenomenon of rising fertility really was an obstacle to the onset of fertility transition.

## **Introduction**

In 1798, in his First Essay on Population, Robert Malthus postulated that “the passion between the sexes is necessary, and will remain nearly in its present state” (Malthus 1798/1986, p. 8). By this, he likely meant that the fertility of married couples had long been close to a biological maximum. It is this perception that helped later demographers formulate the concept of demographic transition: “In traditional societies,” as Paul Demeny puts it, “fertility and mortality are high. In modern societies, fertility and mortality are low. In between there is the demographic transition” (Demeny 1972, p. 153). Here, the supposition is that fertility is low in modern societies because it is regulated, and that regulated fertility is associated with modernity. In other words, when fertility was not regulated, fertility must have been invariably high.

In the 1950s the United Nations lent its weight to this interpretation of fertility transition. A 1953 publication noted, “during the last decade [when population in developing countries started to explode] a number of authors have recalled the Malthusian principle of population and expressed the fear that the present population of earth is drawing near the maximum that its resources can support” (UN 1953, pp.181-82). A larger share of production would have to be used to feed a country’s growing population, it argued, resulting in a decline in saving and hence investment, impeding the country’s economic development, as diagnosed in the case of India by Ansley Coale and E.M. Hoover (1958). Consequently, it argued that some form of family planning had to be introduced to regulate fertility, and this came to form a cornerstone of the UN’s policy for the developing world. From this perspective, it must have been logical for policymakers in the 1970s, such as India’s Indira Gandhi, to opt for a coercive method of fertility control (i.e. sterilisation) in order to accelerate the country’s faltering family planning programmes.

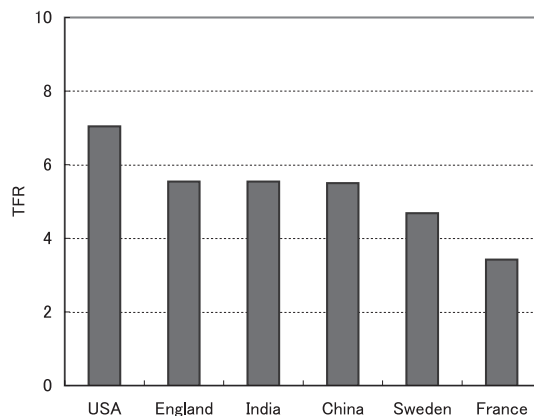
This paper questions the proposition, which underlies the above interpretation of modern

fertility transition, that fertility was invariably high among pre-modern populations. Indeed, recent studies of historical populations have cast doubt upon this interpretation of pre-modern fertility patterns. In the present paper it will be shown, first, that the actual level of fertility varied significantly from population to population, a fact that may be taken to suggest that in most historical populations fertility was below the supposed biological maximum. Second, it will also be suggested that there was a pre-transition rising phase in fertility in countries at both ends of the Eurasian continent. There is now broad consensus among historical demographers on the first proposition, while the second point has been raised relatively recently by specialists working on the post-World War II developing world. This paper adopts a historical approach, examining the factors affecting the pre-transition rise in fertility with reference to the cases of Japan and India in the pre-World War II period, together with the two historic cases of England and Germany, and asks if the phenomenon of rising fertility really was an obstacle to the modern phase of fertility transition.

## 1. Fertility Levels Before the Transition

The fertility transition in the West began in the late nineteenth century. According to the Princeton project on fertility decline in Europe, the dates of the onset of fertility decline are concentrated in the period between 1880 and 1914, with one notable exception, France, whose decline started as early as 1827 (Coale and Watkins 1986, pp. 37-39). In contrast, the transition took place late in Asia: in the 1920s and 1930s in Japan, and in the post-World War II period elsewhere. Taking these differences in the timing of fertility decline into account, I would like to examine the actual levels of fertility among pre-transition populations.

Figure 1 shows Total Fertility Rates for three European, one American and two Asian countries. The Total Fertility Rate (TFR) is a measure of completed fertility for a synthetic cohort of women, regardless of marital status, assumed to pass through life bearing children



Sources: USA: White population. Haines (2000), p. 308.  
 European countries: Livi-Bacci (2001), p. 106.  
 China, 1929-31: Barclay et al. (1976), p. 614.  
 India, 1921-30: Average of Berar, Madras and Punjab. Dyson (1989), and Saito, Takahama and Kaneko (2005).

**Figure 1. Pre-transition Total Fertility Rates**

according to the age-specific birth rates in a given period (all figures in Figure 1 and below refer to the 20-44 age group, rather than the 20-49 group. When figures based on the 20-49 age group are used, a recalculation is made from the original age-specific rates). Calculated in this way, TFR is not affected by changes in the age structure.

Figure 1 compares Western countries in the period around 1800 with Asian countries in the interwar period. It shows that the actual level of fertility in the pre-transition period varied significantly from population to population and, it is interesting to note, that the variation was most pronounced among the Western countries. Indeed, the rate for the United States was nearly twice that of France. If Warren Sanderson's estimate of 8.02 rather than Michael Haines's is taken for the U.S., then the contrast would be even more pronounced (Sanderson 1979; Haines 2000). It is true that in France a drop in fertility within marriage had already started by 1800. However, Britain's rate is about 20 per cent lower than that of the U.S., and Sweden's is a little less than 20 per cent lower than Britain's. Thus, there was considerable variance among the pre-transition Western countries.

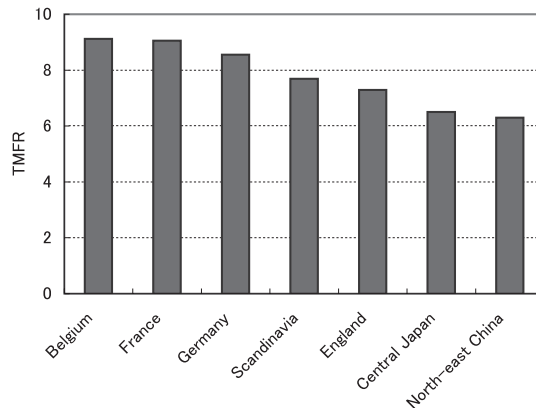
One factor that is believed to lie behind this variability among European countries is marriage. When the mean age at marriage rises, the proportion of single people in younger age groups increases, and hence the numerator of the TFR becomes smaller. Malthus called this mechanism a "preventive check." After the publication of the First Essay on Population, he became aware that population adjustments through mortality (the "positive check") had been less frequent in the European past than was often assumed. In later editions of the Essay, he placed more emphasis on marriage, allowing the level of fertility to adjust to changing circumstances (Malthus 1826/1986). In fact, it is now demonstrated that this mechanism was at work not just in England, but also in the early process of France's fertility decline, when the dominant force is often claimed to have been deliberate family limitation efforts (Wrigley and Schofield 1981; Wrigley 1985).

However, even when focusing on marital fertility, a measure that is not affected by age at marriage, historical case studies show equally significant cross-cultural variations. Moreover, the number of births by married women during their reproductive period does not always reach the level that is normally assumed for populations with unregulated fertility ("natural fertility"). One measure of marital fertility is the Total Marital Fertility Rate (TMFR). Like the TFR, it is a sum of age-specific rates over the same child-bearing period (i.e. 20-44 age group), but it only covers married women.

The data on which Figure 2 is based differ somewhat from those for Figure 1. They are estimates derived from either seventeenth- and eighteenth-century Christian parish registers or eighteenth- and nineteenth-century East Asian village population registers. The hypothetical standard of natural fertility is a TMFR of 8.88. This is an average of several historic populations that are believed to have exhibited unregulated fertility, with the highest being 10.6 for the Hutterites, a North American Baptist population (Henry 1961; Coale and Trussell 1974). In view of this, among the seven cases shown in Figure 2, Germany's figure of 8.55 births per married woman comes close to the natural fertility standard. While both Belgium and France should be regarded as populations with very high natural fertility rates,<sup>1</sup> the English and Scandinavian levels are clearly below the natural standard. Therefore, in terms of the TMFR, too, the variance within the West was not negligible.

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<sup>1</sup> Given this very high level of marital fertility in France, the French TFR in Figure 1 must have reflected a situation in which a process of fertility transition had already started.



Sources: European countries other than England: Flinn (1981).  
 England: Wrigley et al. (1997), p. 450.  
 Central Japan: Tomobe (1991).  
 North-east China: Lee and Campbell (1997), pp. 90, 92.

**Figure 2. Pre-transition Marital Fertility levels**

Interestingly, similar observations have recently been made for non-European countries. Contrary to the stereotypical images of historic Asian societies as being high-fertility, high-pressure populations, the observed levels of Asian fertility were generally lower than those in pre-transition Europe. Figure 2 shows the TMFRs for Liaoning, a north eastern region of China, and Japan's central region. The pre-modern marital fertility levels were comparatively low, being in fact lower than the English level, which happened to be on the low side among European populations. For China, the Liaoning estimate was not one of the lowest. For example, the Princeton team showed that as late as 1930, survey results of 46,000 farm households in 22 provinces suggest a TMFR estimate of 6.2, which is comparable to the Liaoning level. For earlier periods, moreover, the Beijing nobility had a much lower TMFR of 5.3. Polygamy was common, but even if polygamous marriages are included in the calculation, the figure only rises marginally over the Liaoning level of 6.3 (Barclay et al. 1976; Lee and Campbell 1997; Lee and Feng 1999).<sup>2</sup>

For Tokugawa Japan too, the TMFR in central Japan was comparatively low. By Japanese standards, moreover, the estimate is not necessarily on the low side; there are even lower marital-fertility estimates for other regions. Especially in the climatically disadvantaged northern provinces, which were hit by severe famines in the late eighteenth and early nineteenth centuries, the estimated TMFR was as low as 4.2, less than half the Belgian and French levels (Tomobe 1991). In other words, even when controlled for the influence of marriage age, substantial differences remain between cross-cultural fertility levels.

Scattered as the evidence is, all this still suggests that the underlying level of human marital fertility (i.e. "natural fertility") is not a biologically fixed coefficient. It is a variable, which varies cross-culturally and over time.

<sup>2</sup> These Princeton estimates were fiercely attacked by Arthur Wolf, who argued that village populations surveyed by him and other anthropologists had been all pronatalist, usually having a substantial number of children. However, it is more interesting to note that Wolf now concedes in exchanges with Lee and his associates that the fertility level in traditional China may not have been very high. See Wolf (2001) and Campbell, Wang and Lee (2002).

## 2. Factors Accounting for Low Pre-Transition Fertility

Given the findings of substantial differentials in marital fertility among pre-transition populations, one may wonder what accounted for the low to moderate levels in marital fertility, and especially for the very low fertility levels in traditional East Asia (the following draws on Saito 1996b; for a formal demographic exposition, see Bongaarts 1975).

One important factor is feeding practices. It is well known that other factors being held constant, bottle-feeding is associated with shorter birth intervals, and hence with higher marital fertility. The interval between births is influenced by both post-partum amenorrhea and abstinence. The latter becomes important especially when existing customs and taboos lead to unusually long abstinence intervals. Post-partum amenorrhea, on the other hand, is generally more important in explaining the observed differences in marital fertility, as it is strongly affected by feeding customs, that is, whether infants are breast-fed or not. Because of the lactational effect, breast-feeding lengthens the non-susceptible period after birth, thus prolonging the mean birth interval and reducing the total number of births. The longer the period of breast-feeding, therefore, the lower the level of marital fertility. This explains much of the difference in fertility among present-day developing countries. Even in a pre-modern setting, the mean duration of breast-feeding and the proportion of breast-feeding mothers varied considerably, mainly because in some populations wet-nursing was commonly practiced whereas in others breast-feeding was the norm. This fact is said to have accounted for much of the difference in marital fertility between pre-modern England and France.

However, in the cases of imperial China and traditional Japan, both were breast-fed populations. Given the magnitude of their distances from the natural fertility standard, however, there must have been specific socio-economic factors that kept the levels so low. One is “pre-modern family planning,” which is the second item on our list of factors accounting for low pre-transition fertility. For imperial China, James Lee et al. use genealogical data and village-level population registers to argue that two kinds of preventive checks were at work. One involved adjustments through men’s marriages, and the other restrictions on the number of children through infanticide, abortion and neglect. One salient feature of the reproductive culture of pre-modern China was, and still is, a strong son-preference, so that much emphasis was placed not just on the number but also the sex composition of children. This preference could only be satisfied by infanticide and neglect (Lee and Campbell 1997; Lee and Feng 1999).

For Tokugawa Japan as well, it has been argued that a similar kind of “family planning” was practised. Examining family-level micro data, Akira Hayami, Thomas Smith, and other scholars argue that some form of family limitation was practised, but that the motivation for this deliberate control of fertility was not poverty. Having surveyed the existing literature based on case studies, however, I find it difficult to identify a single Japanese pattern of family limitation. Sex-selective infanticide, which definitely existed in one way or another (Tsuya and Kurosu 1999), was probably not as widespread as in imperial China. Nor can I identify any “stopping” pattern of the age-specific fertility schedule. Abortion, on the other hand, may have been practiced more widely, suggesting that “spacing” was the chief concern among Japanese peasant families (Hayami 1969; Hayami 1973, pp.216-224; Smith 1977; Saito

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<sup>3</sup> Hayami’s argument came from data analysis of a village called Yokouchi. In his more recent publication, however, he has moderated his statements about the Yokouchi results in relation to the “stopping or spacing” question (Hayami 2001, pp.111-14).

1992).<sup>3</sup>

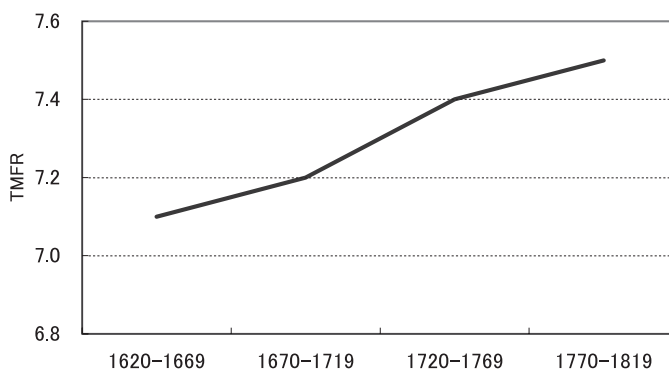
The third factor is famine. Although arguments for the hypothesis of “pre-modern family planning” imply that there were some preventive mechanisms at work, the effects of positive checks such as famine should not be underestimated. One of the stylised facts concerning famine mortality is that the probability of death was higher among adults than children, and among men than women (Dyson and Ó Gráda 2002b). At the time of a mortality crisis, therefore, the probability of a woman’s married life being terminated prematurely was correspondingly high. Famine accentuated this effect of widowhood in two ways; first, the period of childbearing became shorter because many women lost their partners prematurely, and second, famine reduced the fecundity of those who managed to survive the severe food shortage and disease outbreaks that followed. Indeed, this combined negative effect on fertility may have been considerable, as demonstrated by Tim Dyson and Arup Maharatna using monthly data for late nineteenth century India. They found that conception responded to rising grain prices first: the number of conceptions dropped soon after grain prices soared. Death came later, when disease started spreading (Dyson 1991; Maharatna 1996). Although no such monthly data exist for China, an event-history analysis of micro data has demonstrated that grain prices had a significant negative impact on fertility rates in the eighteenth and early nineteenth centuries (Lee and Campbell 2005). For Japan, while a similar micro-analysis failed to detect any significant negative effect (Tsuya and Kurosu 2005), there is some suggestive non-quantitative evidence concerning the relationship between famine and fertility. Therefore, it is not so much that famines, both historic and contemporary, killed a vast number of people, but chiefly that the immediate effect of a famine was to reduce the number of conceptions, regardless of how deadly it was (Saito 2002).

The fourth factor is more specific to Asia: women’s workload in rice-growing peasant societies. One salient characteristic of rice culture in Asia, especially East Asia, is that it is very labour-intensive. During the long process of agricultural development, according to Ester Boserup, a point is reached when the need arises for very labour-intensive farming methods. With the introduction of irrigation and double cropping, for example, the transplanting of seedlings, weeding and other related tasks become necessary, and it is women who have to take up these additional tasks (Boserup 1970, ch. 1). Undoubtedly Tokugawa Japan, as well as parts of China such as the Lower Yangtze delta, had already reached that stage of agricultural progress by the early nineteenth century. This meant that both men and women had to work long hours in the fields. This must have been a heavy burden for married women, since they had to combine farm work with household tasks. According to one early twentieth-century farm survey, men aged 31-50 worked 3,394 hours a year and their wives in the same age group worked 3,440 hours, including domestic work. However, housekeeping and other domestic tasks accounted for less than 50 per cent of their total work. The female total was marginally longer than that for males, but it is more important to realise that for both men and women it meant an extraordinary long work day—well over 11 hours a day assuming that people worked 300 days a year. It is also important to realise that farm women did not take many days off before and after childbirth. Oral histories and case studies of early twentieth-century farming communities show that married women continued to work right up to the week the baby was due. Assuming that this was not very different from the situation before the Meiji Restoration, the adverse effect of this heavy burden on maternal health must have accounted at least partially for the low marital fertility estimates derived from Tokugawa village population registers (Saito 1996a).

### 3. The Pre-Transition Rise in Fertility

The fact that marital fertility was below the biological maximum in many pre-modern countries has important implications for our understanding of demographic transition. It is very likely that there was a phase in which marital fertility tended to rise, rather than decline, before the onset of the modern fertility transition. Of course, there are some important exceptions to this generalisation. As we have seen in Figure 1, North American families exhibited a very high level of fertility around 1800. Case studies of settlers in the colonial period show that their completed family size was around seven, and often reached nine. From that high level, there was a continuous decline right through the nineteenth century, and no period of pre-decline rise in marital fertility was observed (Gemery 2000; Haines 2000). Another exception is France, whose marital fertility is known to have been high at the beginning of the eighteenth century. Again, there was a continuous decline in marital fertility throughout the late eighteenth and entire nineteenth centuries (Wrigley 1985). However, since North American and French people were already populations with very high natural fertility, it may be that there was no room for a further increase in marital fertility, and that couples' initial response to changing circumstances was to restrict fertility, leading eventually to the modern phase of fertility decline.

Put differently, this pair of exceptional cases suggests that in many low- to moderate-fertility populations, there was room for a further rise in marital fertility. Indeed, as shown previously by Dyson and Murphy, it is likely that in those populations the initial response to changing economic and social circumstances was to increase rather than decrease fertility levels (Dyson and Murphy 1985). In their article, they take a cursory look at some historical case studies, but their judgement is chiefly made on the basis of crude death rates and truncated-TFR data for mid-twentieth-century Asian, African and Latin American countries, where the fertility rates rose soon after World War II—a period of strong population growth in the Third World. We tend to think that this rise was triggered almost exclusively by an exogenous decline in mortality. It would be, therefore, of some interest to take a closer look at historical processes in earlier times, for which very little is known. I shall, therefore, examine two historic European cases to substantiate the thesis that even in relatively high-fertility populations, a rise in marital fertility took place before the onset of the modern fertility decline. Then, I will turn my attention to two Asian countries in the period before World War II.



Source: Wrigley et al. (1997), p. 355. Re-calculated for 20-44 age group.

**Figure 3. English Marital Fertility, 1620-1819**



The first piece of evidence comes from pre-industrial England. The English were a breast-fed population and their marital fertility levels were on the low side by European standards. The Cambridge Group's family reconstitution studies give us a clear picture of changes in English marital fertility over the entire early modern period. Their results (Figure 3) show that the TMFR increased by 0.4 points, from 7.1 in the early seventeenth century to 7.5 in the industrial revolution period (Wrigley et al. 1997). Recently, by decomposing infant mortality into its "endogenous" and "exogenous" components, Tony Wrigley found that there was an unmistakable decline in the "endogenous" infant mortality rate during the eighteenth century, and argued that the gradual but persistent rise in marital fertility may have been explained, not so much by changing feeding customs, but by a marked decrease of the incidence of still-birth—a close correlate of the "endogenous" infant mortality rate—over the corresponding period, suggesting that an improvement in women's nutritional status and/or maternal health accounted for the early modern rise in English maternal fertility (Wrigley 1998).



Source: Knodel (1988), p. 257. For TMFRs, re-calculation is made for 20-44 age group.

**Figure 4. German Marital Fertility Indices, 1750-1899**

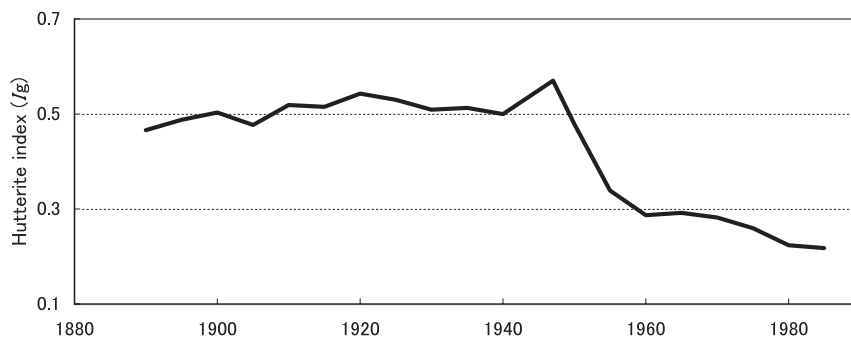
Similarly, John Knodel indicates, for Germany, that a rise in the underlying level of marital fertility took place between the mid-eighteenth century and the turn of the twentieth century (Knodel 1988). Figure 4 reproduces some of the results of his work. The German TMFR levels were generally higher than those for England, and the figures do not indicate any steady rise over the period in question. Rather, there was a dip in the first quarter of the nineteenth century. However, the Coale-Trussell index of marital fertility (*M*), an indicator of the underlying level of marital fertility relative to the hypothetical natural fertility standard, which is shown in the lower panel of Figure 4, exhibits a secular rise over the entire 150-year period.<sup>4</sup> Although Knodel is reluctant to pinpoint the cause of this rise, he does note that while there was never any substantial reduction in permanent sterility, the non-susceptible period after

<sup>4</sup> Although it is not exactly clear why the calculated value of TMFR dropped in the 1800-24 period, a similar decline in the 1875-99 period undoubtedly reflects the onset of the modern fertility decline. During the second half of the century, while the Coale-Trussell index of marital fertility (*M*) was still rising, the paired index of fertility control (*m*) increased from 0.27 to 0.46 (Knodel 1988, p.289).

birth seems to have become shorter. This finding may be taken to imply that changes in feeding practices—from breast-feeding to bottle-feeding—may provide the explanation (ibid. pp.275-80).

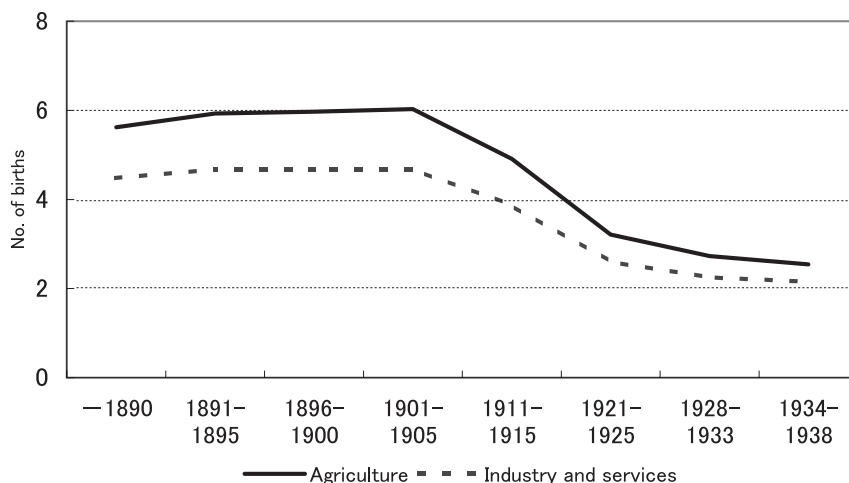
Thus, the English and German cases suggest that even in relatively high-fertility pre-modern populations, there was a gradual rise in underlying marital fertility well before the start of deliberate fertility control. For relatively low-fertility pre-World War II Asian populations, too, it is possible to show that there was a phase of pre-decline rise in marital fertility.

The first is the Japanese case. As we have seen, marital fertility was low in the late Tokugawa period, and it is widely recognised that the modern decline of marital fertility, however modest, started in the 1920s. This declining trend was disrupted by a post-World War II baby boom in the late 1940s. This was followed by a complete break with the past in the following decade. For the period between early Meiji and 1920, official statistics show a clear upward trend in the crude birth rate. There was a debate among earlier generations of demographers; one camp rejected the official data as an artefact that simply reflected an improvement in vital registration. However, an estimated measure of marital fertility also shows an increase (Figure 5). The Hutterite index of marital fertility ( $I_g$ ), derived in reference to the Hutterites' marital fertility schedule, exhibits a slight but steady rise for the period before



Source: Ohbuchi (1987), p. 116.

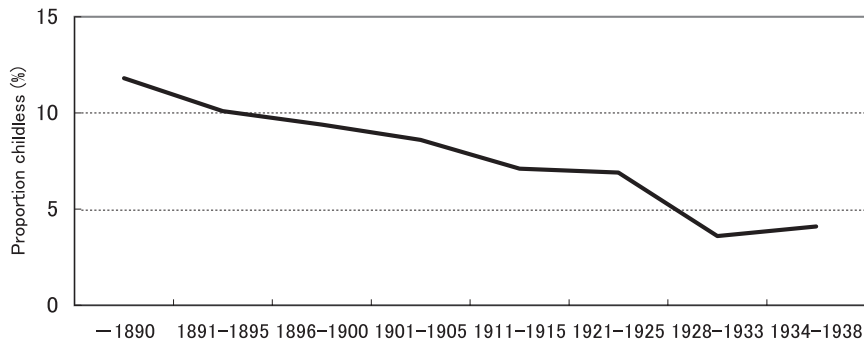
**Figure 5. The Hutterite Index of Marital Fertility in Japan, 1890-1985**



Source: Atoh (1981).

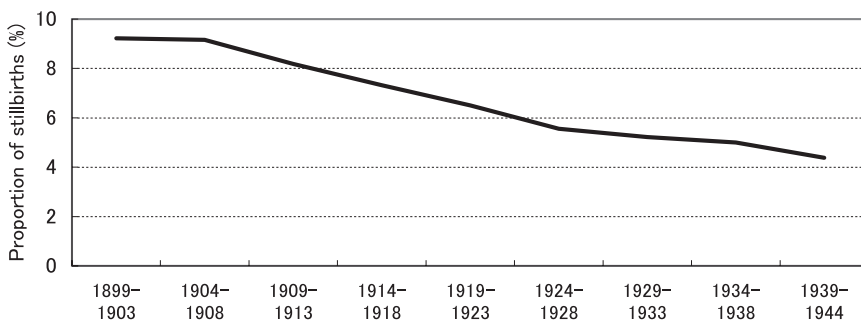
**Figure 6. Completed Family Size by Cohort and by Sector in Japan, c. 1880-1938**

1920 (and subsequent movements confirm the brief chronology above). Similarly, completed family size, derived from a set of retrospective surveys conducted in the post-World War II period (charted in Figure 6), clearly shows an increasing tendency until the 1901-05 cohort, who started bearing children in the 1920s. There was no marked tendency in non-agricultural populations. But in farm populations, whose fertility levels were comparatively high, the upward trend was unmistakable.



Source: Atoh (1981).

**Figure 7. Sterility by Cohort in Japan, c. 1880-1938**

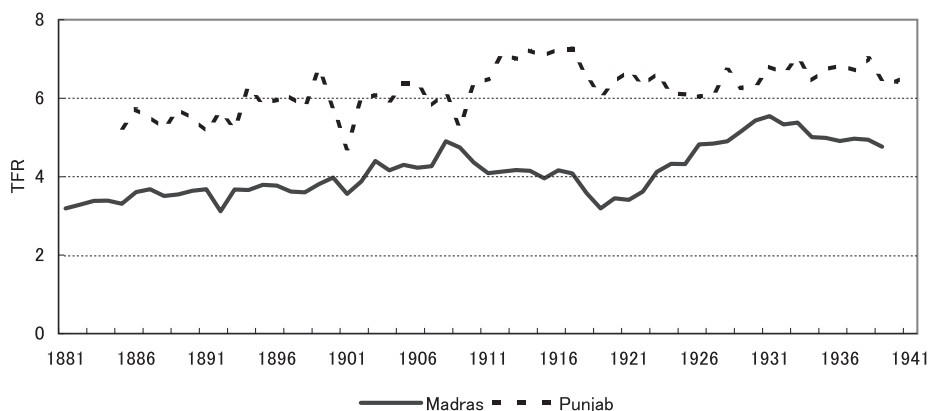


Source: Sōrifu Tōkeikyoku (1987), pp. 203-204.

**Figure 8. Stillbirth Rate in Japan, 1899-1944**

Up to now, few efforts have been made to explain this change in marital fertility. One factor that might have been at work is changing feeding customs, considering that it is documented that the decline of breast-feeding came to the attention of medical practitioners and public health experts in the post-World War I period. But since much of the evidence concerns urban areas, it is unlikely that this factor can account for the rise in fertility among rural women. More interesting, perhaps, is the fact that the proportion of marriages that ended childless was declining over the period in question (Figure 7). The data on which this graph is based are taken from the same sources as those for Figure 6, implying that much of the pre-1920 change in completed family size in Figure 6 was accounted for by this decline in the proportion of childless marriages. As this figure is seen as a measure of permanent sterility, the finding can be interpreted as suggesting that there was a rise in the underlying level of fertility (“natural fertility”). Moreover, as shown in Figure 8, the stillbirth rate was declining during the same period, which may be taken to mean that there was a gradual improvement in nutri-

tional status and maternal health among rural women.<sup>5</sup> It is also interesting to note that following the Tempo famine of the 1830s, the frequency of severe country-wide famines decreased substantially, and that in the north-east, the country's most famine-prone region, and the area with the lowest marital fertility in Tokugawa Japan, the subsequent period saw an unmistakable rise in birth rates (Saito 2002). All this suggests that from late Tokugawa on, there was a gradual, long-run rising tendency in the underlying level of marital fertility.<sup>6</sup>



Source: Saito, Takahama and Kaneko (2005).

**Figure 9. Indian Total Fertility Rates, 1881-1941**

The second piece of Asian evidence comes from colonial India. Its post-World War II demographic record has never been deemed a success in terms of either mortality or fertility transition. As far as the colonial period is concerned, however, comparatively little is known, as reliable all-India series of demographic indicators are not readily available. Thus, we have selected two contrasting provinces, Punjab and Madras, and adopted the methods used by Tim Dyson for the central province of Berar (Dyson 1989), to estimate a series of annual TFRs, together with life expectancy and other demographic measures, for the period after the 1880s. The estimation results are set out in Figure 9 (Saito, Takahama and Kaneko 2005).

First, it is clear from this exercise that there were substantial differences in the level of fertility between the northern and southern provinces. TFR levels were higher in the north, where mortality was also high, whereas the levels of fertility and mortality were comparatively low in the south, where women were more involved in economic activities and in household decision-making. This sharp north-south divide reflects a contrast in the wider socio-demographic contexts, most notably in terms of gender inequality in the economic and social spheres, and is consistent with the observations made by Tim Dyson and Mick Moor finding a relationship between women's autonomy and demographic outcomes in the regions of post-

<sup>5</sup> As is often pointed out, infant mortality was not declining in the period before 1920. However, this was because an increase in post-neonatal mortality (the death rate for 1-11 month olds) outweighed a decrease in neonatal mortality (the death rate for 0-1 month olds). The latter change was consistent with the declining rate of stillbirths.

<sup>6</sup> Ken'ichi Tomobe has recently attempted to estimate, from a few cases of village studies, the Hutterite indices for the Tokugawa period and linked his Tokugawa Ig series to another post-Meiji estimate by Shuichi Takahashi for the period 1879-1935. This preliminary work finds that the level of marital fertility rose during the late eighteenth and early nineteenth centuries, but declined in the third quarter of the nineteenth, then started rising again up to the early years of the twentieth (Tomobe 2001). However, it is probably premature to judge if the observed decline in the period from late Tokugawa to early Meiji was a genuine one.

Independence India (Dyson and Moor 1983).

Second, it should also be emphasised that the TFR was rising in both provinces. Before 1920, TFR values fluctuated with troughs corresponding to famines and outbreaks of infectious diseases, and the levels were generally low, whereas after 1920 these troughs disappeared and the TFRs remained consistently above the previous levels. Given the research finding that the reduced frequency of famines and other demographic crises brought down the general level of mortality (Ortega Osona 2001), on the one hand, and as we have seen in Section 2 above, that a serious crop failure may have reduced fertility in the following year, on the other, we conducted a regression analysis of each province's annual TFR series on the corresponding life expectancy series with varying time lags. The results of this exercise indicate that the fertility-reducing effect of the famine was felt, with a one-year time lag, in the low-fertility south as well as the high-fertility north. The coefficient is estimated to range from 0.035 to 0.075, indicating that a ten-year reduction in life expectancy caused by a famine would be followed by a 0.35-0.75 point drop in the TFR. Although this effect does not seem particularly large, its cumulative effects must have become discernible in the interwar period (Saito, Takahama and Kaneko 2005, Table 4). Clearly the disappearance of countrywide famines and serious infectious diseases, and hence the attenuation of mortality after 1920, must have had a direct bearing on this long-run trend in South Asian fertility (Dyson 2001).

The Indian and Japanese case studies suggest, hence, that in low-fertility Asian populations, the initial demographic response to changing economic and social circumstances in the modern era was for marital fertility to rise, rather than to fall. In view of this finding, the UN diagnosis of the 1950s was incorrect and its excessive emphasis on fertility control may have been counterproductive.

#### 4. Arguments

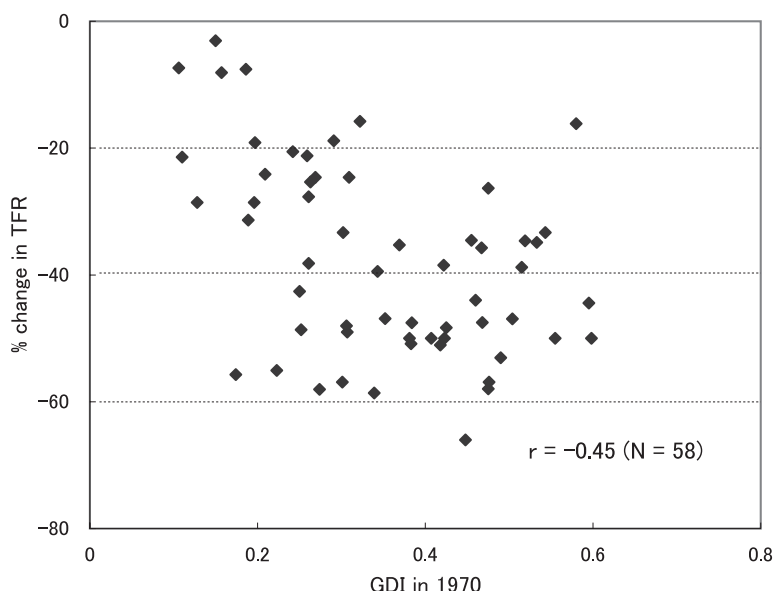
Having confirmed that in various historical populations prior to the onset of modern fertility decline, there was a phase in which marital fertility rose, one may ask: Was the pre-transition rise in marital fertility a *bad* thing?

Macro-economically, it seems self-evident that it was, because it enlarged the denominator of per-capita GDP and similar macro-economic measures. In fact, however, this judgement depends on what time period we are looking at, and in what period the pre-transition rise in fertility took place. In England it happened well before the start of modern economic growth, and, it took a century or more for the process to be completed. In Germany, it took place in the early nineteenth century—at about the same time the economy took off—while in Japan, it coincided with the interwar period, when a drive towards full-fledged industrialisation was launched. In India, it occurred towards the end of the colonial period, at a time when fluctuations in mortality were attenuated, bringing down the general level of mortality without any noticeable economic betterment. And in present-day developing countries, a rise in fertility took place for a relatively short period of the 1950s and 60s, when the economies were struggling for economic take-off.

From a different perspective, however, the pre-transition rise in marital fertility may well have been a *good* thing. Given the list of causes for the fertility rise suggested by scholars so far, it is rather difficult to label the changes as “bad”. For example, in the Indian case, the decline in the frequency of famines resulted in an attenuation of mortality fluctuations in the early twentieth century. This achievement was by no means negligible for India, and would be

welcome for any population as it increased the overall standard of living.

At the micro level as well, the reduced incidence of stillbirth, the decrease in the number of childless marriages, and other changes associated with an increase in natural fertility are always considered laudable achievements. The only fertility-increasing factor that cannot be considered a “good” thing is the switch from breast-feeding to bottle-feeding, but even this may have been associated with an increase in participation by women in economic activities or their autonomy in decision making, or both. All the other items on the list are factors that lead to a reduction in the incidence of stillbirth and in “endogenous” infant mortality, on the one hand, and to a decrease in maternal mortality and hence an increase in women’s life expectancy, on the other. In other words, they are factors that raise the level of women’s nutritional status and hence enhance the quality of women’s lives. It is probably true that such micro-level improvements in the quality of female life led to a temporary increase in overall fertility, but there is no evidence that the improved quality of female life was a hindrance to the longer-run course of fertility decline in the post-World War II developing world.



Sources: UNDP (1995), Table 3.4, and UNDP (2000), Appendix table 19.

Note: The calculation of % change in TFR is based on 1970–75 and 1995–2000 averages.

**Figure 10. Percentage Change in Total Fertility Rate, 1970–2000, and the Initial Level of Gender-related Development Index**

It is difficult, of course, to substantiate the proposition that the process of fertility transition was actually accelerated by those improvements. In view of the suggestions by Dyson and Moor regarding the relationship between women’s status and demographic outcomes, however, it will be interesting to see if gender-related indices and the magnitude of fertility decline exhibited any correlation in the course of late twentieth-century development. For this, a development index adjusted for gender inequality, the “Gender-related Development Index” (GDI), may be useful. This UN-defined Human Development Index, which is adjusted for gender differences, is a composite of basic capability measures, i.e. real income, educational

attainment and life expectancy, after taking note of inequalities between men and women (UNDP 1995). By definition, therefore, all the underlying causes of rising natural fertility must, *ceteris paribus*, increase the value of GDI. Figure 10 is a scatter diagram showing percentage changes in TFR over the 1970-2000 period against the initial levels of GDI for 58 developing countries. Clearly there is no positive correlation. In fact, the coefficient of correlation is  $-0.45$ , meaning that the higher the initial GDI value, the greater the subsequent decline in TFR over the 1970-2000 period. Indeed, if the percentage change in TFR is regressed on the percentage change in GDI over the 1970-1992 period as well as on the GDI in 1970 for the same 58-country sample, the coefficients of both variables on the right-hand of the equation turn out to be negative, with statistical significance.<sup>7</sup> Crude as this test may be, it is not unlikely that an advance in women's nutritional status and autonomy eventually accelerated the process of fertility decline.

Clearly, much more has to be done to link the pre-transition rise in fertility and the subsequent process of fertility decline. What I have argued in this essay is simply that most of changes behind the observed increase in marital fertility were closely associated with improvements in women's nutritional status and maternal health, and that as such, the phenomena of rising fertility even at the time of economic take-off should not be dismissed as "bad" things.

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<sup>7</sup> The result of OLS estimation is:

$$Y = 2.63 - 78.7 X_1 - 0.18 X_2 \quad (\text{adjusted } R^2 = 0.24; \text{d.f.} = 55),$$

$$(0.23) \quad (-4.33^*) \quad (-2.18 \uparrow)$$

where  $Y$  is the percentage change in TFR from 1970/75 to 1995/2000,  $X_1$  GDI in 1970, and  $X_2$  the percentage change in GDI from 1970 to 1992 (GDI takes a value of 1.0 if a country exhibits a maximum achievement in basic capabilities with perfect gender equality; other variables are all expressed in per cent). Figures in parentheses are t statistics with \* indicating statistical significance at the 0.01 level and  $\uparrow$  at the 0.05 level.

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